

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-9 are pending in the present application. Claims 1-3, 6 and 7 are amended by the present amendment. Claim amendments find support at least in the originally filed claims, thus it is believed no new matter is added.

In the outstanding Office Action, Claims 1-5 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,178,313 to Mages et al. (herein “Mages”); and Claims 6-9 were indicated as allowable if rewritten in independent form.

Applicants gratefully acknowledge the Examiner’s indication of allowable subject matter.

Claims 1-5 were rejected under 35 U.S.C. § 103(a) as unpatentable over Mages. Applicants respectfully traverse that rejection.

First, Applicants respectfully traverse the statements in the outstanding Office Action that “controlling the power amplifier using a bias current or a ‘bias voltage’ is essentially the same,”¹ and that “Mages further teaches the claimed subject matter ‘compensation means for compensating a gain variation of said power amplifier involved in controlling the bias voltage of said power amplifier by controlling the gain of said variable gain amplifier.’”²

However, as seen from the description of Col. 2, lines 29-45, Mages indicates that a gain of the power amplifier is proportional to a bias current applied thereto. In other words, by increasing the bias current applied to the power amplifier, a corresponding increase in the gain of the power amplifier is exhibited, and a decrease in the bias current applied to the power amplifier causes a corresponding decrease in the gain exhibited by the power amplifier. Further, Mages describes reducing power consumption by varying bias current for

¹ Office Action at page 3, lines 1-2.

² Office Action at page 3, lines 3-5.

the power amplifier in accordance with a desired transmit power level, which is changed in the closed loop power control. Thus, according to Mages, the gain variation of the power amplifier, which is caused by the control (or change) of the bias current, is included as a factor necessary to a change of the desired transmit power level for the closed loop power control. As such, the apparatus in Mages does not compensate the gain variation of the power amplifier which is caused by controlling or changing the bias current.

Namely, control in Mages is as set forth below:

desired transmit power	Power amplifier gain	Power amplifier bias current	VGA gain	VGA control signal value
X1 dBm	A1	B1	C1	D1
X2 dBm	A2	B2	C2	D2
...

Therefore, an element 46 in Fig. 2 of Mages does not compensate the gain variation of the power amplifier involved in changing the bias current of the power amplifier by controlling the Variable Gain Amplifier (VGA). That is to say, the total gain of transmitter is determined by both gains of the VGA and the power amplifier.

On the other hand, the present invention compensates, by controlling the gain of the VGA, the gain variation (Δ Gain), which is caused in the power amplifier by varying the bias current for the power amplifier in accordance with the desired transmit power level (i.e., changing by a control such as the closed loop power control).

Thus, control in the invention of Claim 1 maybe represented as set forth below:

desired transmit power	Power amplifier gain	Power amplifier bias current	VGA gain	VGA control signal value
X1 dBm	A1	B1	C1	D1
X2 dBm	A1- Δ Gain	B2	C2+ Δ Gain	D2+ Δ signal
...

Thus, according to the invention of Claim 1, the gain variation due to the bias variation of the power amplifier is compensated by adjusting the gain of the VGA, whereby output power can be accurately controlled.

Further, Mages discloses varying the gain of the VGA. However, Mages does not teach or suggest a compensation system which compensates the gain variation of the power amplifier by controlling the gain of VGA.

Furthermore, Mages discloses, at column 6, lines 40-42, that DSP 148 compensates for the temperature and frequency gain variations by adjusting the reference current using a lookup table. However, Mages does not disclose the gain compensating system for the gain variation due to bias change of the power amplifier, the details of the compensation table and the necessity of compensation.

As described above, the invention of Claim 1 is distinguishable over the reference of Mages. When the bias current applied to the power amplifier is changed according to the desired transmit power level, it is unavoidable that gain of the power amplifier also varies. It is the feature of the claimed invention to compensate such a gain variation caused in the power amplifier by adjusting gain of the VGA. However, the communication device of Mages does not compensate, in VGA, such a gain variation of the power amplifier caused by varying its bias current according to the desired transmit power level. Namely, the reference of Mages does not teach or suggest that gain of the power amplifier is varied by changing the bias voltage. Further Mages does not teach determining a control signal for controlling the gain of the VGA in accordance with the gain variation of the power amplifier. Hence, Mages does not teach or suggest a “gain compensation controller configured to compensate a gain variation of said power amplifier,” as in amended Claim 1.

Accordingly, Applicants respectfully submit that independent Claim 1 and claims depending therefrom are allowable.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599

Eckhard H. Kuesters
Registration No. 28,870

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)
GJM:EHK:ZSS:dnf